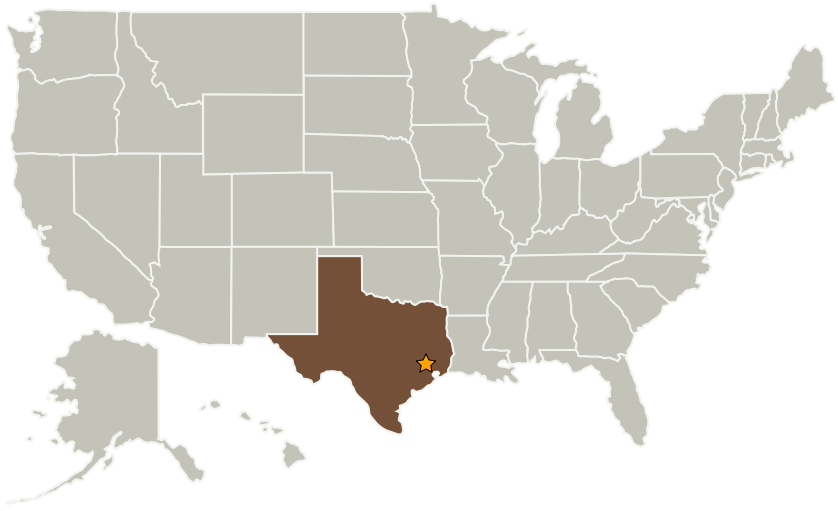
Coordinated Mobile Manipulation for Robotics Material Handling, Phase II

Completed Technology Project (2009 - 2011)

Project Introduction

Robots will play an important role in NASA's exploration activities over the next several decades. They will land on the Lunar surface ahead of humans and help prepare for human exploration. They will explore the Lunar surface, build structures and move regolith. As humans arrive these robots will shift to assisting humans in exploration activities. All of these activities require a new generation of robotic vehicles -- ones capable of flexible, dexterous manipulation -- that can work in closely coordinated teams. This work focuses on coordinating the use of mobility and manipulator degrees of freedom to achieve a common manipulation purpose. We coordinate multiple mobile manipulators so as to achieve a common goal, such as grasping or manipulating an object so that it can be transported or mated. The coordinated control architecture has four components: 1) motion planning for cooperative mechanisms; 2) task sequencing and monitoring; 3) coordinated control; and 4) operator interfaces for robot teams. The architecture will be evaluated with respect to an assembly scenario implemented both in simulation and using several mobile manipulation robots.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Metrica, Inc.	Supporting Organization	Industry Minority-Owned Business, Women-Owned Small Business (WOSB)	San Antonio, Texas

Primary U.S. Work Locations
Texas

Project Transitions

June 2009: Project Start

June 2011: Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX04 Robotic Systems
  - TX04.3 Manipulation
    - TX04.3.1 Dexterous Manipulation